Sustainability
and
Executive Order 13423

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Executive Orders Promoting Sustainability

EO	Focus	Date
12852	President's Council on Sustainable Development	June 1993
13101	Greening the Government through Waste Prevention, Recycling, and Federal Acquisition	September 1998
13123	Greening the Government through Efficient Energy Management	June 1999
13134	Developing and Promoting Biobased Products and Bioenergy	August 1999
13148	Greening the Government through Leadership in Environmental Management	April 2000
13149	Greening the Government through Federal Fleet and Transportation Efficiency	April 2000
13423	Strengthening Federal Environmental, Energy, and Transportation Management	January 2007

EO 13423

Energy Conservation

- Improve energy efficiency
  - i.e., utility performance
- Reduce greenhouse gases
  - i.e. via better efficiency
- Reduce energy intensity
  - i.e. energy consumption per sq.ft. building space
- New renewable energy sources
  - i.e. biofuels, solar, wind, etc.

EO 13423

- Water Conservation
  - Reduce water consumption intensity
- Affirmative Procurement
  - Sustainable environmental practices
    - Biobased
    - Environmentally preferrable
    - Energy efficient
    - Water efficient
    - Recycled content
  - All use of paper – greater than 30% post-consumer fiber

EO 13423

- Pollution Prevention
  - Reduce use of toxic and hazardous materials
  - Reduce disposal of toxic and hazardous materials
  - Increase diversion of solid waste from landfill
  - Maintain cost-effective prevention programs
  - Maintain cost-effective recycling programs
- E-Waste
  - Meet 95% of EPEAT registered electronic product requirements
  - 100% use of Energy Star
  - Policies to extend life of electronic equipment
  - Environmentally-sound disposal practices

EO 13423

- Sustainable Building Design
  - Use 2006 Guiding Principles for new construction and major renovation
  - Incorporate sustainable practices for Federal capital asset building inventory
- Motor Vehicle Fleets
  - If fleet >20 vehicles
    - Reduce petroleum based fuels
    - Increase non-petroleum-based fuels
    - Use plug-in hybrids if available

Sustainability

- Basis: "How long can human ecological systems be expected to be usefully productive"
- Focus: Provide best outcomes for both the human and natural environment
- Considers: Human social values with parallel care for the ecosystem

Common Principles of Sustainability

- Address/reduce risk, uncertainty and irreversibility
- Ensure appropriate valuation of nature
- Integrate environmental, social, human and economic goals
- Conserve biodiversity and ecological integrity
- Ensure inter-generational equity
- Commit to best practices

Barriers to Sustainability

- Conflict between natural capital and man-made capital
- Resistance to adopting sustainable practices
- Social “resistance to change”
- Built-in permanence and reliability
- Carbon impact
- Personal greed

At least two viewpoints:

1. Sustainability and Business
   - Sustainable development and operations
   - Not necessarily a trade-off with competitiveness
   - Eco-innovations that are economically attractive
   - Can be “good business” too!

2. Sustainability and Society
   - Sustainable communities, growth
   - Sustain our natural resources for future generations
   - Awareness is the key

Measurement

- Growth versus impact
- Impact of activity on the environment
- Capacity of natural environment to sustain further impacts
- Recovery of ecosystem

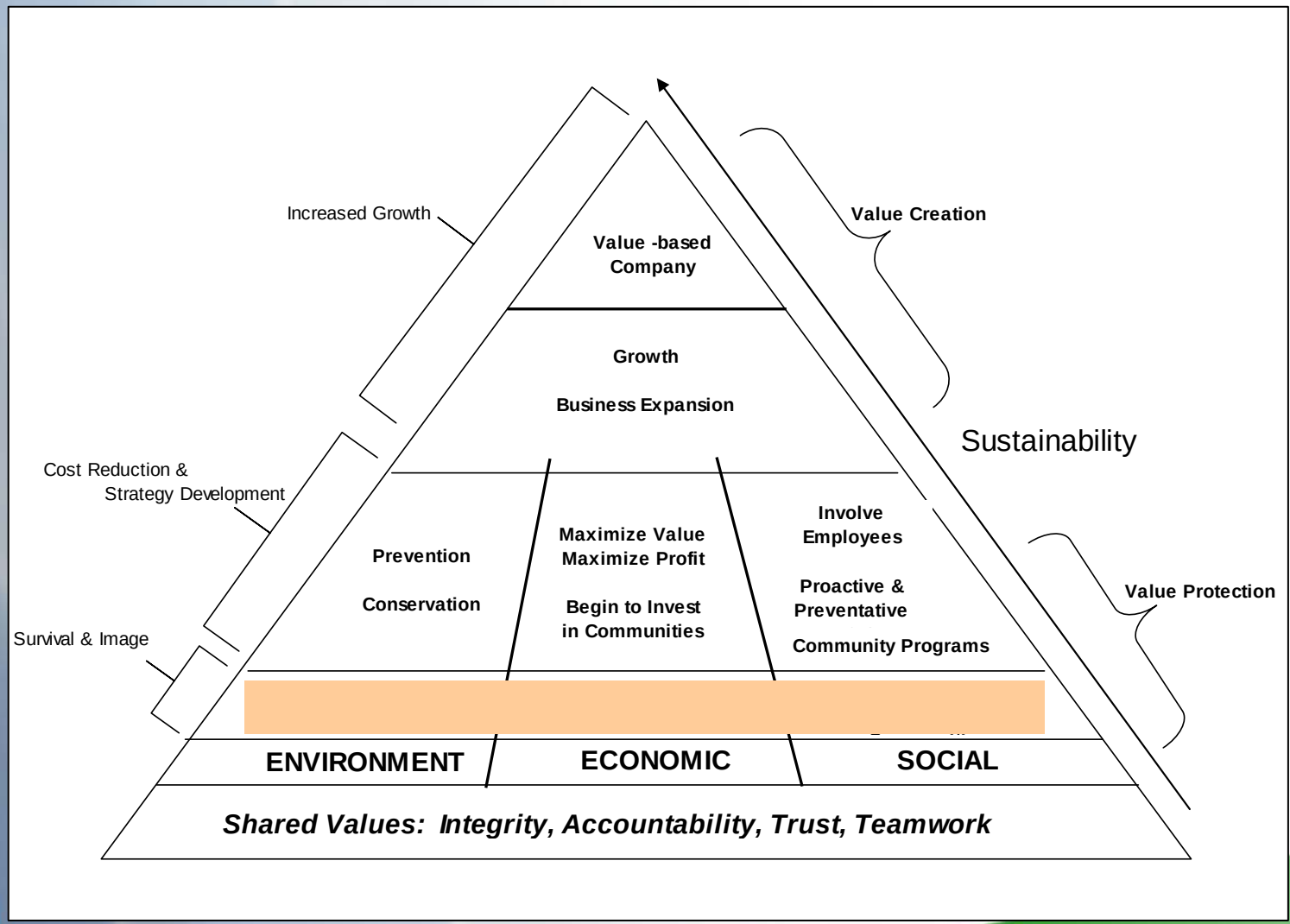
Focus Areas

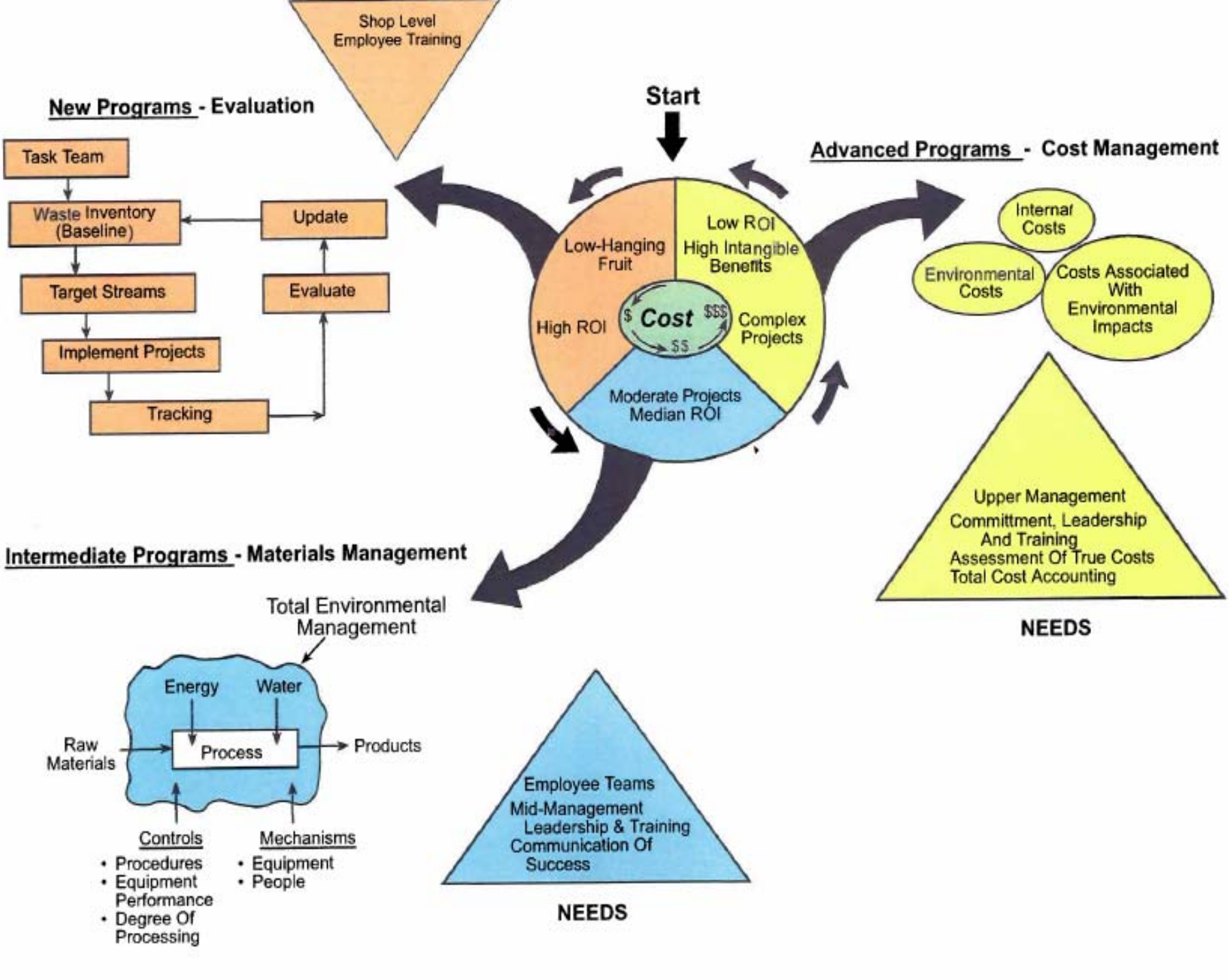
- Pollution Prevention
- Protection and Conservation
  - Water, Ecosystems, Agriculture
  - Air
- Renewable Energy
- Materials and Toxics
- Built Environment
- Climate Change

Typical Metrics

- Zero Waste to the Environment
- Zero Wastewater to the Environment
- Water use Conservation
- Greenhouse Gas Reduction
- Zero Carbon Impact
- TRI Reductions
- Affirmative Procurement (raw materials with recycled content is mandated)

Business Model




Shop Level
Employee Training
New Programs - Evaluation
Task Team
Waste Inventory (Baseline)
Target Streams
Implement Projects
Tracking
Update
Evaluate
Start
Low-Hanging Fruit
Low ROI
High Intangible Benefits
High ROI
$ Cost $$$
$$
Complex Projects
Moderate Projects Median ROI
Advanced Programs - Cost Management
Internal Costs
Environmental Costs
Costs Associated With Environmental Impacts
Upper Management
Committment, Leadership And Training
Assessment Of True Costs
Total Cost Accounting
NEEDS
Intermediate Programs - Materials Management
Total Environmental Management
Energy
Water
Raw Materials
Process
Products
Controls
• Procedures
• Equipment Performance
• Degree Of Processing
Mechanisms
• Equipment
• People
Employee Teams
Mid-Management
Leadership & Training
Communication Of Success
NEEDS

EPA Approach

- Built Environment
- Water, Ecosystems & Agriculture
- Energy & Environment
- Materials & Toxics

EPA website:

www.epa.gov/sustainability

Impact on Air Force Programs

Current programs at the facility level:

- EMS
- ESOH
- Pollution Prevention
- Biofuels

Current programs at the command level:

- Built environment
- Affirmative Procurement

Impact on Air Force Programs

What is missing?

- Measurement
- Funding sources
- Integration

Schlitz Audubon Center
Milwaukee Wisconsin

- LEED Gold
- 35,000 sq. ft.
- Extensive use of daylight
- Natural ventilation
- Geothermal HVAC
- Low flow plumbing
- Site harvested lumber for building
- Recycled content materials
- Low VOC finishes
- Construction waste recycling

Energy Efficiency and Energy Supply Twentynine Palms, CA

- ESPC
- Chiller Plant Upgrades
- 7 MW Cogeneration Plant
  - Savings in electricity of $5.8
  - Hot water 30-35 MBtu/hr

- Next phase:
  - 1.1 MW photovoltaic system
  - New chilled water plants
  - Building automation system for base-wide energy management

Steelcase
Grand Rapids, Michigan

- 600,000 sq.ft. wood furniture manufacture
- LEED Silver
- Reduced heat islands
- Alternative transportation and fuels
- Low flow plumbing
- Water recovery
- Lighting (meets Tier 24)
- Waste heat recovery
- Recycled content in construction

University of South Carolina Bio-Based Cogeneration

- Biomass gasification
- Innovative
- ESPC
- $5.9 million in annual savings

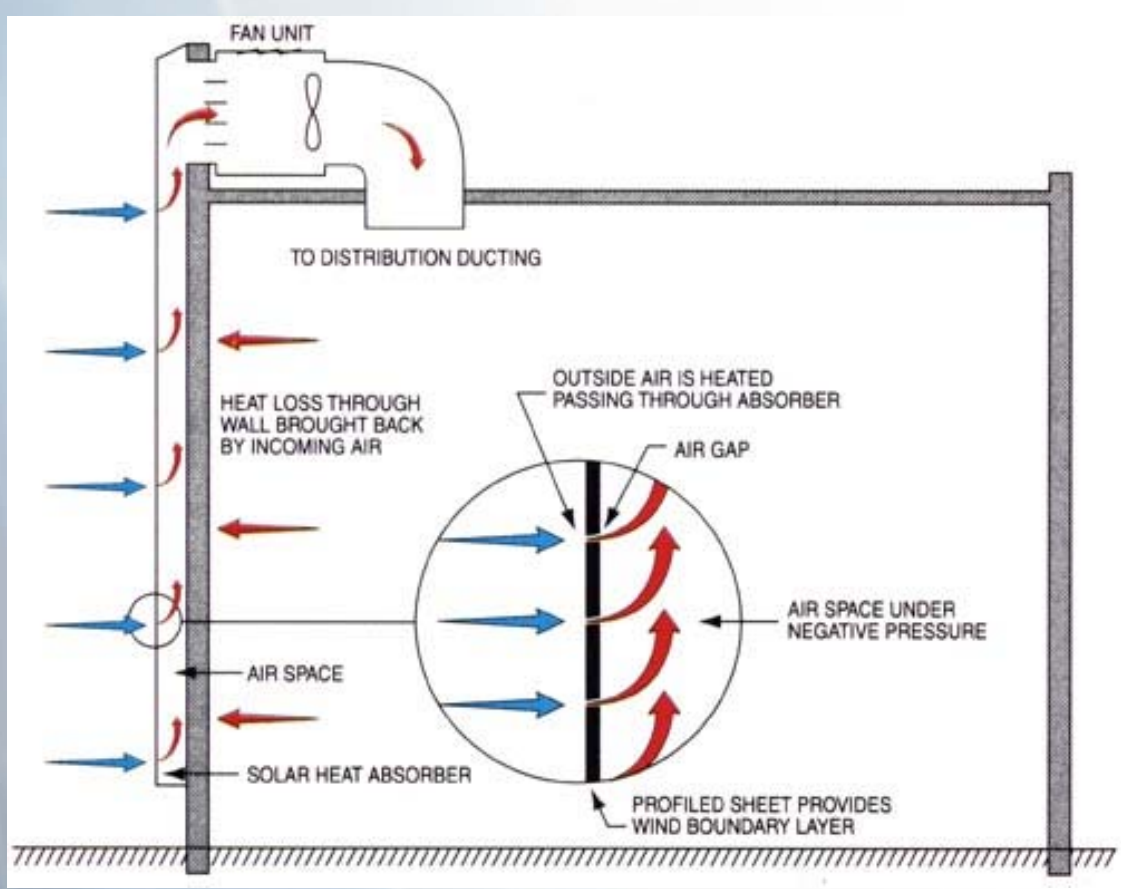
Pollution Prevention

- Materials Substitution
- Product reformulation
- Process Change
- Reuse
- Recycle

Example: Energy Reduction
Solar Panels

Solar Wall Installation at Building 1623 (NASA)

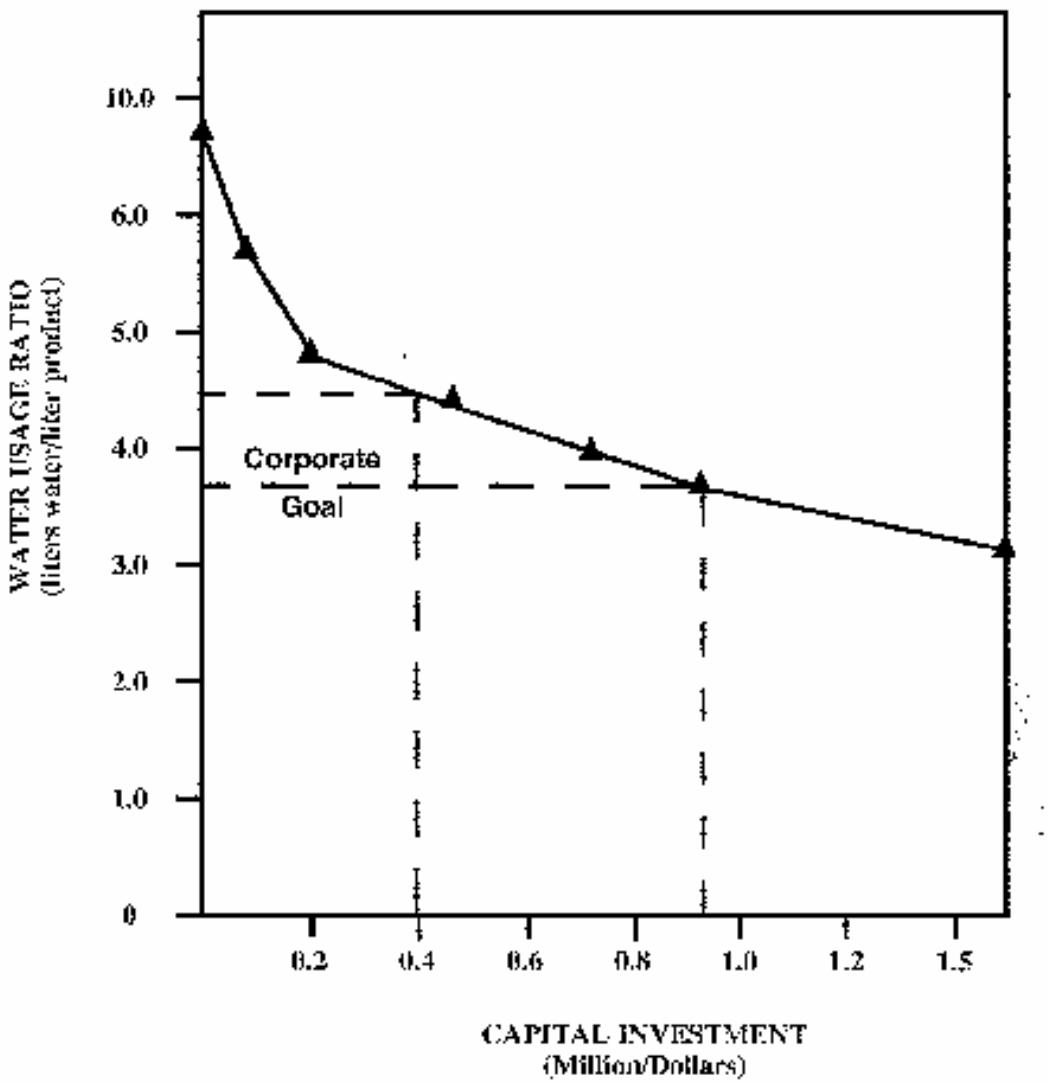
Energy Use and NOx Reduction at Boilers


FAN UNIT
TO DISTRIBUTION DUCTING
HEAT LOSS THROUGH WALL BROUGHT BACK BY INCOMING AIR
OUTSIDE AIR IS HEATED PASSING THROUGH ABSORBER
AIR GAP
AIR SPACE UNDER NEGATIVE PRESSURE
AIR SPACE
SOLAR HEAT ABSORBER
PROFILED SHEET PROVIDES WIND BOUNDARY LAYER

Solar Wall Schematic

Water Conservation / Wastewater Reduction (Beverage Industry)

- Developed water use and wastewater discharge balance for facility
- Developed tools to self-perform assessment
- Developed metrics to evaluate performance against other similar facilities
- Provided guidance to evaluate results
- Provided specific water use reduction ideas and wastewater discharge reduction ideas
- Evaluated tertiary treatment technologies to achieve zero discharge
- Provided training for guidanc essment tools



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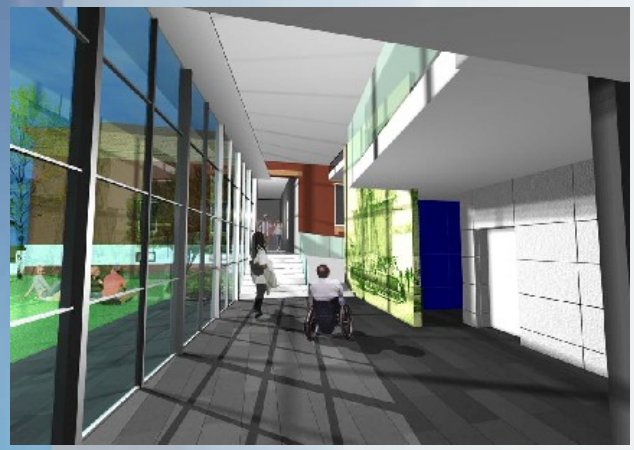
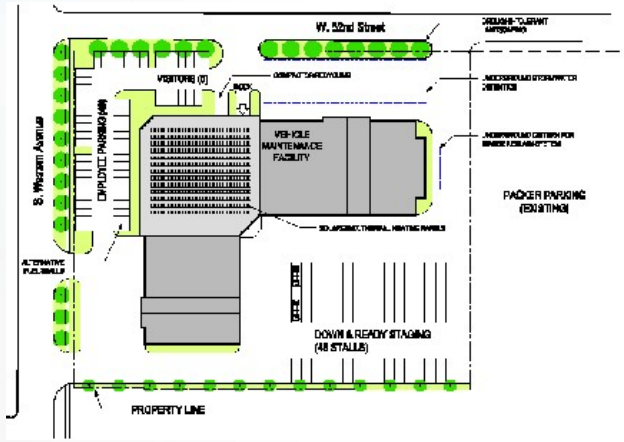
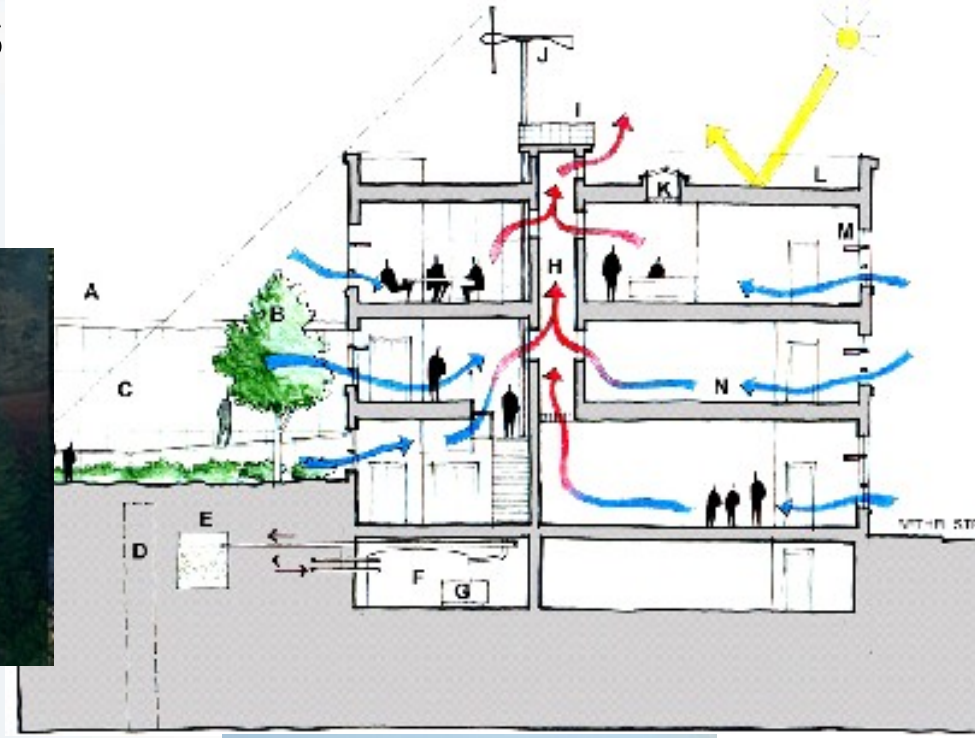
possible

Green Buildings





Green Buildings



LEED Certification of Green Buildings

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A BETTER TOMORROW made possible

Sample From NC Web Site

Yes	?	No	Sustainable Sites		14 Points
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
			Credit 1	**Site Selection**	1
			Credit 2	**Development Density & Community Connectivity**	1
			Credit 3	**Brownfield Redevelopment**	1
			Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
			Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	1
			Credit 4.4	**Alternative Transportation**, Parking Capacity	1
			Credit 5.1	**Site Development**, Protect of Restore Habitat	1
			Credit 5.2	**Site Development**, Maximize Open Space	1
			Credit 6.1	**Stormwater Design**, Quantity Control	1
			Credit 6.2	**Stormwater Design**, Quality Control	1
			Credit 7.1	**Heat Island Effect**, Non-Roof	1
			Credit 7.2	**Heat Island Effect**, Roof	1
			Credit 8	**Light Pollution Reduction**	1

Yes ? No

Yes	?	No		
			Water Efficiency	5 Points
			Credit 1.1 **Water Efficient Landscaping**, Reduce by 50%	1
			Credit 1.2 **Water Efficient Landscaping**, No Potable Use or No Irrigation	1
			Credit 2 **Innovative Wastewater Technologies**	1
			Credit 3.1 **Water Use Reduction**, 20% Reduction	1
			Credit 3.2 **Water Use Reduction**, 30% Reduction	1

Yes	?	No			
			Energy & Atmosphere		**17 Points**
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required
			Credit 1	**Optimize Energy Performance**	1 to 10
			Credit 2	**On-Site Renewable Energy**	1 to 3
			Credit 3	**Enhanced Commissioning**	1
			Credit 4	**Enhanced Refrigerant Management**	1
			Credit 5	**Measurement & Verification**	1
			Credit 6	**Green Power**	1

Yes	?	No			
			Materials & Resources		**13** Points
Y			Prereq 1	**Storage & Collection of Recyclables**	Required
			Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1
			Credit 1.2	**Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof	1
			Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1
			Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
			Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
			Credit 3.1	**Materials Reuse**, 5%	1
			Credit 3.2	**Materials Reuse**,10%	1
			Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
			Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1
			Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regional	1
			Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regional	1
			Credit 6	**Rapidly Renewable Materials**	1
			Credit 7	**Certified Wood**	1

Yes	?	No			
			Indoor Environmental Quality		**15** Points
Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
			Credit 1	**Outdoor Air Delivery Monitoring**	1
			Credit 2	**Increased Ventilation**	1
			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
			Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1
			Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1
			Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
			Credit 6.1	**Controllability of Systems**, Lighting	1
			Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
			Credit 7.1	**Thermal Comfort**, Design	1
			Credit 7.2	**Thermal Comfort**, Verification	1
			Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
			Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Yes	?	No		
			Innovation & Design Process	**5** Points
			Credit 1.1 **Innovation in Design**: Provide Specific Title	1
			Credit 1.2 **Innovation in Design**: Provide Specific Title	1
			Credit 1.3 **Innovation in Design**: Provide Specific Title	1
			Credit 1.4 **Innovation in Design**: Provide Specific Title	1
			Credit 2 **LEED® Accredited Professional**	1
Yes	?	No		
			Project Totals (pre-certification estimates)	**69** Points

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

Business Model

Value-Based Company
Increased Growth
Growth & Business Development
Value Creation
SUSTAINABILITY
Cost Reduction & Strategic Preparation
Prevention & Conservation
Value-Maximizing & Profitable Company & Investment in Communities
Employee Involvement, Preventive & Proactive Health, Safety & Social Programs
Survival & Image
Value Protection
Non-Compliance, Complaints & Remediation
Breakeven/Cover Cost of Capital
Employee Relations, Accidents & Fatalities, Long-Term Health Effects & Impact on Communities
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